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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/617,547	07/10/2003	Lawrence R. Plotkin	10010828-1	4281
22879	7590	06/20/2006	EXAMINER	
HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			ECHELMeyer, ALIX ELIZABETH	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 06/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/617,547

Applicant(s)

PLOTKIN, LAWRENCE R.

Examiner

Alix Elizabeth Echelmeyer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-72 is/are pending in the application.
- 4a) Of the above claim(s) 19-26 and 51-72 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 27-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>7-10-03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I in the reply filed on May 25, 2006 is acknowledged. The traversal is on the ground that Group II recites a device capable of delivering one specific material, while the examiner stated that it recites a device capable of delivering quantities of at least two materials. This is not found persuasive because, although the device of Group II may be capable of delivering only one material, it still falls into a different class and subclass from Group I, and thus presents a burdensome search.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 5-9, 27, 28, 29, 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Aoyama (US Pre-Grant Publication 2005/0217178).

Regarding claim 1, Aoyama teaches a fuel injector for delivering fuel to an electrochemical cell (Figure 10; [0116]). As for claims 5 and 7, Aoyama teaches a control system that controls the amount ejected through the nozzle ([0040]-[0041]).

As for claims 6, 8, and 9, Aoyama teaches a fuel-mixing chamber where fuel is mixed with air (abstract, [0008]). The fuel-mixing chamber delivers the fuel to the anode (Fig. 10). The fuel-mixing chamber further comprises a heating section and a catalyzing section (Fig. 1, [0006], [0029]).

Regarding claims 2 and 27, the fuel being processed in the fuel device would inherently have to come from some sort of storage tank or vessel since it could not come from the ambient environment of the device. Further, the fuel cell shown in Figure 10 that uses the fuel supplied by the fuel device would inherently include an inlet, an outlet, and an anode, and is described as supporting the reaction of the fuel delivered to the anode (claim 8 of Aoyama).

As for claims 28 and 29, Aoyama teaches that the fuel supply device delivers fuel to the anode of the fuel cell and that the nozzle of the injector is connected to the fuel inlet of the fuel supply device (see above).

Regarding claim 40, Aoyama teaches an external interface for receiving an external command (Figure 1, [0095]).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 4, 10-13, 30-39, 43, 44, 47, 48, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama in view of Saito et al. (US Pre-Grant Publication 2002/0022171).

The teachings of Aoyama as discussed above are incorporated herein.

Regarding claims 10, 11 and 12, Aoyama teaches mixture of two compositions before they are provided to the anode, but fails to teach a second ejector for a second composition.

Saito et al. teach a fuel supply device with a plurality of ejectors, each with a nozzle ([0015]). One ejector is for hydrogen fuel while the second is for fuel recirculated from the fuel cell ([0048]). Further, the two components mix in the merging passage before entering the fuel cells ([0081]).

It would be advantageous to have two ejectors because it would allow for two different components, such as hydrogen and recirculated hydrogen, to be prepared for use in a fuel cell.

Further, regarding claims 3, 4, 13, 30, 31, 33, 38, 43, 44, 47, 48 Saito et al. teach that hydrogen is recirculated from the fuel cell, and the amount that is added back into

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the merging passage by a second ejector is regulated by a reflux chamber and the control device for the system ([0020], [0048], [0051]-[0052], [0055]).

It is desirable to recirculate unused hydrogen from the fuel cell because it increases fuel efficiency ([0006]).

Therefore, it would have been obvious to one having ordinary skill in the art to combine the fuel device of Aoyama with the two-ejector system of Saito et al. in order to allow for two different components to be provided to the anode of the fuel cell, especially if the second component was recirculated fuel, because it would result in an increase in fuel efficiency.

With further regard to claims 3, 13, 33 and 38, Aoyama teaches that the fuel that is provided to the anode is mixed in a stoichiometric relationship ([0037], [0086]).

With further regard to claims 30-32 and 50, the water separation tank (16 in Figure 1), serves as a storage tank for the fuel being recirculated, as it provides a place to separate water from the fuel before it is sent to the second ejector of the fuel supply system.

As for claim 33, Saito et al. teach a channel for removing a reaction byproduct and conveying it to the fuel supply device. Further, it is inherent to have a channel to transport a reaction component since this would allow for the component to be transported.

Regarding claim 34, the ejector for the recirculated fuel is taught above.

As for claims 35 and 36, Aoyama teaches a control system comprising sensors and an external switch (Fig. 1, [0040]-[0041]).

Regarding claims 37, 39 and 49, Aoyama in view of Saito et al. teach the nozzle and mixing portion (see above) and that the nozzle is controlled by the control unit ([0041]).

As for claim 47, Aoyama teaches a fuel-mixing chamber (see above).

6. Claims 14-17, 41, 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama in view of Takahashi (US Patent Number 5,746,985).

The teachings of Aoyama as discussed above are incorporated herein.

Aoyama teaches both a heating section and a section where the fuel undergoes a catalytic reaction within the fuel-mixing chamber. Aoyama fails to teach a resistor coated with a catalytic material.

Takahashi teaches a heating resistor, excellent in heat transmission, inside a fuel-reforming device. The resistor is further embedded in a catalyst, which allows heat to be transmitted to the catalyst more efficiently, causing the reaction to start more rapidly (column 2 lines 63-67; column 3 lines 1-6).

It is taught by Takahashi that using a resistor embedded in a catalyst is desirable since it is more efficient and causes the reaction to occur more rapidly than the system of Aoyama.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the fuel-mixing chamber of Aoyama with

the resistor embedded in a catalyst of Takahashi in order to make a more efficient system in which the reaction of the fuel occurs more rapidly.

7. Claims 18, 45, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama in view of Saito et al. as applied to claims 10, 43, and 44 above, and further in view of Takahashi.

The teachings of Aoyama, Saito et al., and Takahashi as discussed above are incorporated herein.

Aoyama and Saito et al. teach the limitations of claims 10, 43, and 44, but fail to teach the resistor or catalyst of claims 18 and 45.

Takahashi teaches the use of a resistor embedded in a catalyst.

The motivation to add the resistor embedded in a catalyst as taught by Takahashi to the fuel-mixing chamber of Aoyama is given in 7, and the motivation to combine Aoyama with Saito et al. is given in 6.

Therefore, it would have been obvious to one having ordinary skill in the art to combine the resistor embedded in a catalyst with the combination of Aoyama's fuel processor and the hydrogen recirculation system of Saito et al. in order to create a more efficient system, through the reuse of fuel and the increased efficiency provided by the heating of the catalyst.

With further regard to claim 46, Saito et al. teach that the injection amount of recirculated fuel is controlled by the controlling valve ([0041]).


Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Edlund et al. (US Patent Number 6,869,707) and Sahoda et al. (US Pre-Grant Publication 2002/0022172).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

Alix Elizabeth Echelmeyer
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Art Unit 1745

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